

Ultra Low Temperature Electronics (ULTE)

Completed Technology Project (2015 - 2017)



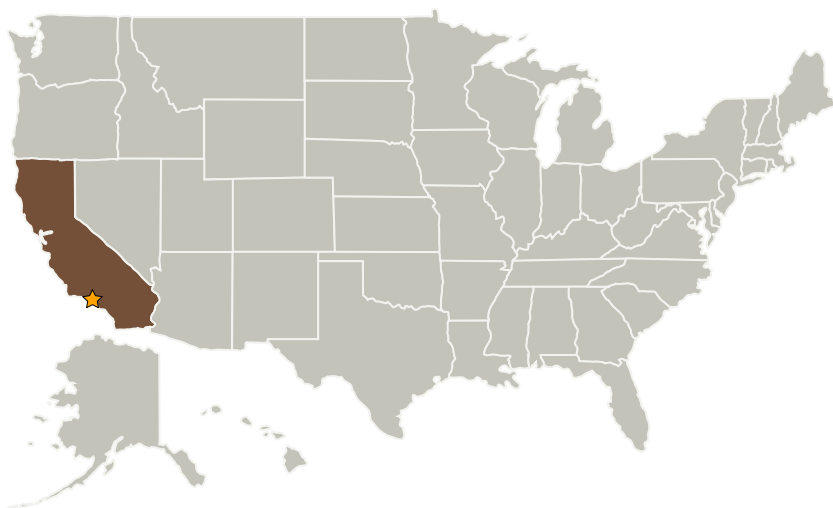
Project Introduction

Develop electronics that maximize the science return from Europa lander by allow the lander to last longer on the surface and enable additional science instruments. This goal will be achieved through: Electronic Packaging - Dramatically reduce electronics volume and mass through the use of advanced packaging. Low Power Multi-Core Computing - Develop an advanced embedded processing module that enables reduction significant reduction in power and processing mass. Cold Capable Electronics & Cameras - Reduce the power required for survival & operational heating by allowing electronic assemblies to operate and survive at temperatures beyond the Mil-Std temperature range of -55 to +125_C.

Anticipated Benefits

NASA funded: This technology significantly reduces the mass and power over the current Europa Lander baseline avionics suite. The benefits of the improved mass/volume/power enable an extended set of science requirements (e.g. additional instrument or increased lifetime). NASA unfunded: This technology will benefit future deep space missions as bridges the GAP in SWAP between existing rad750-based avionics systems and the those that will eventually be based on the HPSC. Nation: Significantly contributes to scientific discovery on the surface of Europa.

Primary U.S. Work Locations and Key Partners



Ultra Low Temperature Electronics

Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Transitions	2
Project Website:	2
Project Management	2
Technology Maturity (TRL)	2
Target Destination	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Game Changing Development

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Project Transitions

▶ **October 2015:** Project Start

✔ **April 2017:** Closed out

Closeout Summary: The resolver and motor driver modules achieved TRL 6. The computer card and low temperature design rules achieved TRL5. All of these technologies support the Europa Lander project at JPL and have been infused into that project. This project advanced the command, data handling, power management, and motor control needs for future rover missions to ocean worlds such as the Europa Lander project. The technology goal was to allow the lander to survive a longer time period under the extreme cold conditions on the surface and provide for more surplus power capability for additional science by reducing the avionics volume, mass and power requirements. Advances made under this project were incorporated into the Europa program.

Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Project Management

Program Director:

Mary J Werkheiser

Program Manager:

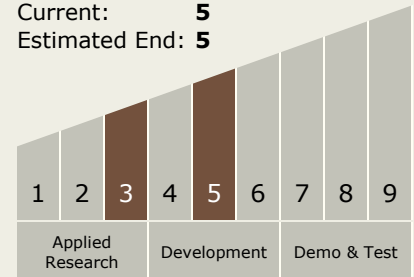
Gary F Meyering

Principal Investigator:

Thomas A Cwik

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Target Destination

Others Inside the Solar System